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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/534,125

11/18/2005

Thorsten Mayer

R.304250

8479

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7590

08/24/2006

RONALD E. GREIGG
GREIGG & GREIGG P.L.L.C.
1423 POWHATAN STREET, UNIT ONE
ALEXANDRIA, VA 22314

EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/534,125

Applicant(s)

MAYER ET AL.

Examiner

Tu M. Nguyen

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-28 and 30 is/are rejected.
- 7) ☒ Claim(s) 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

1. An Applicant's Amendment filed on August 4, 2006 has been entered. Claims 11, 17-20, 29, and 30 have been amended. Overall, claims 11-30 are pending in this application.

Drawings

2. The formal drawing of Figure 1 filed on August 4, 2006 has been accepted for entry.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 11-20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krutzsch et al. (U.S. Patent 5,921,076) in view of Akama et al. (U.S. Patent Application 2002/0038542).

Re claims 11 and 30, as depicted in Figure 1, Krutzsch et al. disclose a method and an apparatus for post-treatment of the exhaust gas of an internal combustion engine (1), in which nitric oxides contained in the exhaust gas are selectively catalytically reduced, the method comprising:

- delivering a first auxiliary agent (HC) from a supply (5) thereof to the exhaust gas;
- subjecting an hydrogen producing fluid (water, methanol, HC) at least intermittently to a chemical conversion (in hydrogen generator (6)) into a second auxiliary agent (hydrogen) (see lines 56-60 of column 2);

- storing the second auxiliary agent in an intermediate reservoir (6) (lines 56-60 of column 2); and

- at least intermittently, delivering the second auxiliary agent to the exhaust gas parallel to or in alternation with the first auxiliary agent (see lines 11-30 of column 3 and Figures 3-4).

Krutzsch et al., however, fail to disclose that the HC generator (5) is incorporated with the hydrogen generator (6).

As shown in Figure 1, Akama et al. teach that it is conventional in the art to incorporate a hydrogen generator (10) with a fuel tank (7) so that a fuel from the fuel tank is reformed with a carrier gas (exhaust gas) in the hydrogen generator to produce a hydrogen-containing gas for injection into an exhaust gas stream to remove NO_x at a NO_x reducing catalyst (6). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Akama et al. in the method and apparatus of Krutzsch et al., since the use thereof would have been routinely utilized by those with ordinary skill in the art to reduce complexity in an exhaust gas system.

Re claims 12-13, in the modified method of Krutzsch et al., in a so-called normal operating mode of the engine, a delivery of the first auxiliary agent exclusively is effected, and wherein at selected time intervals outside the normal operating mode, in particular during a cold-starting phase of the engine, a delivery of the second auxiliary agent exclusively is effected (lines

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12-17 of column 4), wherein the chemical conversion is effected during the normal operating mode (generator (6) is also used for storing hydrogen).

Re claims 14-16, in the modified method of Krutzsch et al., it is obvious that the chemical conversion is performed only until such time as the intermediate reservoir is full.

Re claims 17-20, in the modified method of Krutzsch et al., it is also obvious that in order to save space and cost, the volume of the intermediate reservoir is dimensioned such that a quantity of second auxiliary agent that meets the demand for the second auxiliary agent during a cold-starting phase of the engine is stored.

5. Claims 21, 24; 22, 25; and 23, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krutzsch et al. in view of Akama et al. as applied to claims 11; 12; and 13, respectively, above, and further in view of design choice.

In the modified method of Krutzsch et al., the first auxiliary agent is HC and the second auxiliary agent is ammonia. Thus, they fail to disclose that the first auxiliary agent is a substance that releases ammonia at sufficiently high temperatures and the second auxiliary agent is ammonia.

Reducing agents for use in internal combustion engines can take the form of many different compounds such as hydrogen, diesel fuel, urea, etc. One having ordinary skill in the art would have selected the specific compound based on available resources. For example, the reducing fluid for a NO_x catalyst with a diesel engine would normally be diesel fuel because diesel fuel would be readily accessible. In gasoline engines, one having ordinary skill in the art would have selected any of the known reducing agents based on necessity, since gasoline engines normally would not have diesel fuel on board. One of the other fluids mentioned above

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such as urea would have to be selected for a gasoline engine. Therefore, with regard to applicants claim directed to a specified auxiliary agent, the specification of such would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables, such as a type of the engine (i.e., for a diesel engine, a system that has HC and hydrogen is used. On the other hand, for a gasoline engine, a system that has urea and ammonia is used). Moreover, there is nothing in the record which establishes that the specification of such presents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

6. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krutzsch et al. in view of Akama et al. as applied to claims 11 and 12, respectively, above, and further in view of design choice and Kinugasa et al. (U.S. Patent 6,109,024).

The modified method of Krutzsch et al. discloses the invention as cited above, however, fails to disclose that the first auxiliary agent is a substance that releases ammonia and the second auxiliary agent is ammonia; and that a zeolite body or a salt that forms an ammonia complex is used as the intermediate reservoir.

Reducing agents for use in internal combustion engines can take the form of many different compounds such as hydrogen, diesel fuel, urea, etc. One having ordinary skill in the art would have selected the specific compound based on available resources. For example, the reducing fluid for a NO_x catalyst with a diesel engine would normally be diesel fuel because diesel fuel would be readily accessible. In gasoline engines, one having ordinary skill in the art would have selected any of the known reducing agents based on necessity, since gasoline engines normally would not have diesel fuel on board. One of the other fluids mentioned above

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such as urea would have to be selected for a gasoline engine. Therefore, with regard to applicants claim directed to a specified auxiliary agent, the specification of such would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables, such as a type of the engine (i.e., for a diesel engine, a system that has HC and hydrogen is used. On the other hand, for a gasoline engine, a system that has urea and ammonia is used). Moreover, there is nothing in the record which establishes that the specification of such presents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

As shown in Figure 1, Kinugasa et al. disclose an exhaust gas after-treatment device comprising an ammonia adsorbing-denitrating catalyst (9). As indicated on lines 31-39 of column 10, they teach that it is conventional in the art to utilize a zeolite body as a component in the ammonia adsorbing-denitrating catalyst (9) to adsorb ammonia. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Kinugasa et al. in the modified method of Krutzsch et al., since the use thereof would have been routinely utilized by those with ordinary skill in the art to store ammonia for a future use.

Allowable Subject Matter

7. Claim 29 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant argues that Krutzsch et al. do not disclose or suggest a step of converting a portion of a first agent to a second agent; and thus, it is improper to combine Akama et al. with Krutzsch et al. to arrive at the applicant's invention (page 9 of Applicant's Amendment). The examiner respectfully disagrees with this argument.

As indicated on lines 56-60 of column 2, Krutzsch et al. state that a variety of devices are used as a hydrogen generator (6) to generate hydrogen gas. One of these is a device that cracks or partially oxidizes a working fluid containing hydrogen atom compounds into hydrogen gas. One with ordinary skill in the art immediately recognizes that such working fluids include many widely available hydrocarbon fuels such as diesel fuel or gasoline. Since such fuels are also used to run an engine, one would expect that there are numerous occasions in which a hydrocarbon fuel from a fuel tank is fed to the engine and to a hydrogen generator. The reference of Akama et al. is then utilized to show that this is the case; and that it is conventional in the art to

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incorporate a hydrogen generator (10) with a fuel tank (7) so that a fuel from the fuel tank is cracked in the hydrogen generator to produce a hydrogen-containing gas for injection into an exhaust gas stream to remove NO_x at a NO_x reducing catalyst (6). By doing this, one would reduce a complexity of the vehicle by having only one fuel tank instead of two tanks as in the case of Krutzsch et al.

As a result, the examiner has shown that there are advantages in using the teachings of Akama et al. in Krutzsch et al.; and that it is proper to combine the two references in order to reduce a complexity of the vehicle in Krutzsch et al.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

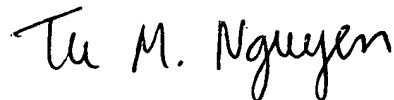
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Communication

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

August 18, 2006

Primary Examiner

Art Unit 3748



Appl. No. 10/534,125
Amdt. dated August 4, 2006
Reply to Office action of May 17, 2006

REPLACEMENT SHEET

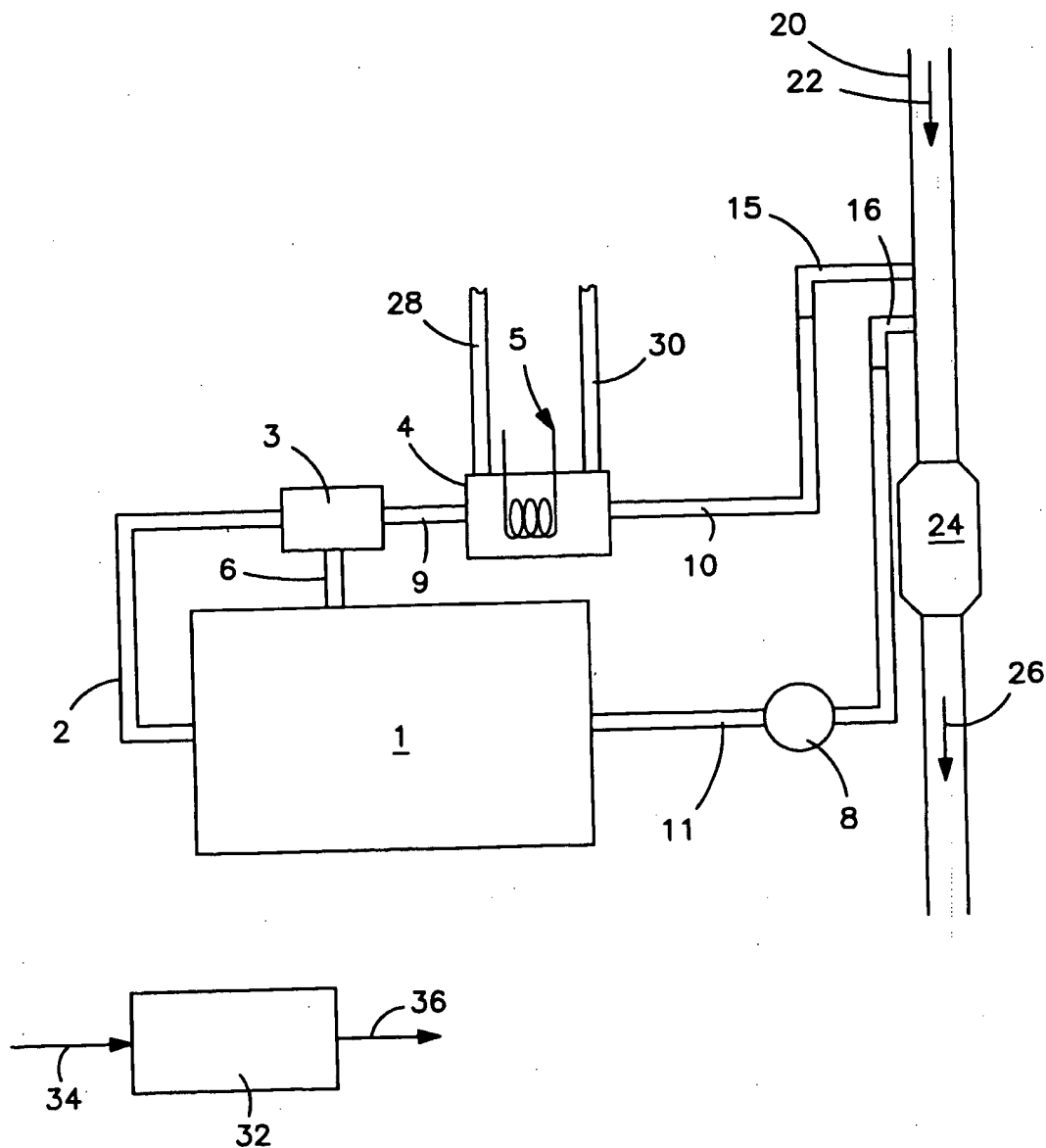


FIG. 1

Approved for Entry
8/18/06
TMN